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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE REISSUE APPLICATION OF:

PATENTEE: ANDREA DREI

TITLE: DEVICE FOR THE ADVANCEMENT OF BARS, PARTICULARLY  
NARROW BARS, IN AUTOMATIC LOADERS

PATENT NO.: 5,890,407

ISSUE DATE: APRIL 6, 1999



TRANSMITTAL LETTER FOR FILING REISSUE  
APPLICATION UNDER 37 CFR 1.171-1.179

Assistant Commissioner of Patents  
and Trademarks

Washington, D.C. 20231

Sir:

The attached application for Reissue of U.S. Patent 5,890,407 is being filed under the provisions of Rule 1.53(b)(1) of the Rules of Practice in Patent and Trademark cases.

Accordingly, we are enclosing the following documents at this time:

- (a) Specification, Claims and Abstract;
- (b) Informal Drawings (3 sheets)
- (c) Reissue Declaration (attached to Specification, claims and abstract)
- (d) Power of Attorney by Assignee of Entire Interest

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- (e) Offer To Surrender and Assent of Assignee to Reissue (with attached certified copy of abstract of title)
- (f) Filing Fee \$1020.00 (check)

If there are any additional charges with respect to this reissue patent application or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicant's attorney.

Respectfully submitted,

ANDREA DREI

CANTOR COLBURN LLP  
Applicant's Attorneys

By: 

Michael A. Cantor  
Registration No. 31,152

Date July 17, 2000

Address: 55 Griffin Road South, Bloomfield, CT 06002

Telephone: (860) 286-2929

# DEVICE FOR THE ADVANCEMENT OF BARS. PARTICULARLY NARROW BARS. IN AUTOMATIC LOADERS

## BACKGROUND OF THE INVENTION

The present invention relates to a device for the advancement of bars, particularly narrow bars, in automatic loaders.

In conventional automatic loaders, shortcomings are observed which substantially consist in their excessive longitudinal bulk and in the difficulty in achieving the advancement of bars having a very small diameter, on the order of 1-2 mm.

## SUMMARY OF THE INVENTION

A principal aim of the present invention is therefore to provide a device which allows to obviate the above mentioned drawbacks, which are typical of conventional loaders.

This aim is achieved by means of a device for the advancement of bars, particularly narrow bars, in automatic loaders provided with a loading system for a plurality of bars, with a mechanism for the individual release of said bars, and with a pusher provided with a collet which is adapted to receive the rear end of the released bar, characterized in that it comprises: guiding means, whereon supporting elements for a bar released from said system and a carriage provided with grip elements for said bar are slideable, said carriage being actuated between an initial position, wherein said grip elements are activated so as to grip a bar deposited on said supporting elements, and a final position, whereat said bar is released by said grip elements after insertion in the collet of the pusher and is secured in the spindle of an automatic lathe, said pusher being supported so as to move parallel to itself; and means for locking and actuating said pusher after said carriage between an offset position and a position where it is aligned with the bar deposited on said supporting elements when said carriage is in the final position.

## BRIEF DESCRIPTION OF THE DRAWINGS

Further particularities of the present invention will become apparent from the following description of a preferred embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

FIG. 1 is a partially schematic elevation view of the device according to the invention;

FIG. 2 is a plan view of the device of FIG. 1;

FIG. 3 is a sectional view, taken along the plane III—III of FIG. 1;

FIG. 4 is a sectional view, taken along the plane IV—IV of FIG. 1;

FIG. 5 is a sectional view, taken along the same plane as FIG. 4, but in a different (subsequent) operating condition;

FIG. 6 is a sectional view, taken along the plane VI—VI of FIG. 1;

FIG. 7 is a sectional view, taken along the plane VII—VII of FIG. 2.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the above figures, the reference numeral 1 designates a housing for containing the device, which comprises two uprights 2 and 3 which are inter-connected by two horizontal and parallel rods 4 and 5 lying on a vertical plane.

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The upper end of the shaft 26a protrudes upwards from the carriage 6 and an arm 27, which supports a roller 28, is coupled to said end.

The roller 28 is meant to cooperate with a locator 29 which is fixed to the top of the upright 3 and allows to reset the flat plate 25 once it has been released, as will become apparent hereinafter, to allow the intervention of the elements provided for the advancement of the bar towards the lathe.

In order to retain the flat plate 25 in the reset position, i.e., at right angles to the rods 4 and 5, there is provided a lever 30 which is pivoted in the carriage 6 below the flat plate 25. Said lever has an arm 31 protruding downwards at an angle and supporting a roller 32 which rotatably engages a straight cam 33 which runs parallel to the bars 4 and 5 below the carriage 6.

The second arm 34 of the lever 30 is adapted to act as retainer for the flat plate 25.

The cam 33 has such a profile as to prevent the flat plate 25, by means of the arm 34, from rotating into the position which is parallel to the bars 4 and 5 over a certain extent which lies between the locator 29 and the upright 2. When the carriage 6 is near the upright 2, the cam 33 lifts the arm 31 of the lever 30, causing the arm 34 to move downwards until the flat plate 25 is allowed to rotate freely.

With the flat plate 25 in this position, it is possible to act on the bar 17 with a device which feeds the bar into the lathe to perform the intended machining operations. Said device includes two shoulders 35, which protrude from the uprights 2 and 3 and wherebetween a guide 36 for a chain 37 is provided. The chain 37 is closed in a loop about respective toothed pulleys (not shown), one of which is motorized. The guide 36 is rotatable with respect to the shoulders 35 and has a longitudinal slot through which a flap 38 protrudes laterally; a bar pusher 39 is rigidly coupled to said flap, is parallel to A, and is provided with a collet to grip the bar to be fed. The flap 38 is rigidly coupled axially to the chain but it is rotatable thereabout.

The guide 36 is supported by a plurality of bushes 40 which are inter-connected by a longitudinal member 41.

The bushes 40 are provided with lateral slots to allow, like the guide, the passage of the flap 38 during the advancement of the bar pusher.

An arm 42 is radially rigidly coupled to the longitudinal member 41 and is connected to a jack 43, whose actuation causes the rotation of the guide through an angle of 90° which allows the bar pusher 39 to oscillate from a lowered position below the guide (FIG. 4) to a raised position in which it is aligned with A.

The operation of the described device is as follows.

Assume that the carriage 6 is arranged proximate to the right upright 3, with the blades 11 and 14 spaced apart, and that the bar pusher 39 is also fully shifted to the right, below the guide 36, as shown in FIG. 4. When the carriage 6 is in the indicated position, the brackets 22 are spaced one from the other, so that by actuating the individual selection device it is possible to remove a single bar 17 from the magazine and deposit it on the supports 23. At this point, the chain 19 is actuated and, by moving the carriage 6 towards the left in the direction F, causes the abutment of the flat plate 25 against the end of the rod which is deposited on the supports 23. During this step, the flat plate is kept by the lever 30 on a plane which is perpendicular to the carriage advancement direction.

By means of the sensor 26, the jack 16 is then actuated, and by means of the posts 7, 8 and pinion 9 actuates the closure of the blades 11 and 14, which grip the bar 17 and insert it in the spindle of the lathe as the stroke of the carriage 6 continues.

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During the stroke of the carriage 6, after the blades 11 and 14 have clamped around the bar 17, the cam 33 actuates the oscillation of the lever 30 into a position for disengagement from the flat plate 25, which by means of spring means is returned to an arrangement which is parallel to the bars 4 and 5 outside the axial space occupation of the bar.

When the carriage 6 has reached the left stroke limit and the brackets 22 have stacked up against the upright 2, the jack 43 is actuated, causing the oscillation of the bar pusher 39 into a position that is coaxial to the advancement line A.

At this point, the bar 17 is inserted in the collet of the bar pusher 39, again by means of the chain 19.

Then, after actuating the jack 16 in the direction for opening the blades 11-14, the bar pusher 39 can act on the bar 17 and push it into the spindle of the lathe for the intended machining steps.

During the operation of the bar pusher 39, the carriage 6 waits in the forward position until said bar pusher returns with the final machining stub of the bar 17.

Once the return stroke of the bar pusher 39 has been performed, by actuating the jack 16 in the direction for closing the blades 11-14 it is possible to extract the bar stub from the collet of the bar pusher by acting on the chain 19.

The bar pusher 39 can return to the initial position and the carriage 6, with the stub, is returned to the initial position, which is close to the upright 3, until the roller 28 engages on the locator 29.

This engagement causes the rotation of the flat plate 25 into the position that lies at right angles to the rods 4 and 5, where it is retained by the oscillation of the lever 30 allowed by the cam 33.

Accordingly, the actuation of the jack 16 causes the opening of the blades and the fall of the bar stub always in the rear position of the loader.

The cycle is repeated in the above described manner.

It is evident that the described invention perfectly achieves the intended aim and objects.

In particular, the grip of the bar by the blades prevents the danger of deformations during the pre-advancement stroke in the loader, prior to insertion in the collet of the bar pusher, furthermore the safe grip of the bar allows to achieve high speeds and to perform sharp braking actions, which would otherwise not be allowed, reducing cycle timings.

Numerous modifications and variations are possible in the practical embodiment of the invention and all are within the scope of the same inventive concept expressed in the appended claims.

What is claimed is:

1. A device for the advancement of bars in automatic loaders provided with a loading system for a plurality of bars, with a mechanism for the individual release of said bars, and with a pusher adapted to connect with a collet which is adapted to receive the rear end of a released bar, comprising: guiding means, whereon supporting elements to support a bar released from said system, and a carriage provided with grip elements for said bar, are slideable, said carriage being actuated between an initial position, where said grip elements are actuated so as to grip the bar deposited on said supporting elements, and a final position, where said bar is released by said grip elements, after inserting the bar in the collet, and is inserted in a spindle of an automatic lathe, said pusher being supported so as to translate; and means for locking and actuating said pusher between an offset position and a position where said pusher is aligned with the bar deposited on said supporting elements when said carriage is in the final position.

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2. A device according to claim 1, comprising: a flat plate articulated on said carriage and adapted to oscillate between a position for abutment on said bar and an inactive position; and a sensor mounted on said flat plate and adapted to detect the abutment of said flat plate against one end of said bar and to activate said grip elements to grip said bar; said flat plate being retained in said abutment position by a lever which is articulated on said carriage and is controlled by a cam, said cam being adapted to actuate said lever from a position for retaining said flat plate in said abutment position into a position where said flat plate can assume said inactive position.

3. A device according to claim 1, wherein said grip elements are constituted by V-shaped blade elements which are actuated in mutual contrast to grip the released bar interposed between them.

4. A device according to claim 3, wherein said blade elements are fixed on two respective posts which are parallel and slidingly supported in said carriage and have racks which mesh with a pinion, with which a lever is radially

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7. A device according to claim 6, wherein said guide is rotatably supported and said pusher is connected to said flexible traction element by means of a flap which is guided through a slot of said guide, said guide being actuated by a fluid-actuated jack between said offset and aligned positions of said pusher with respect to said bar.

\* \* \* \* \*



CLAIM 8. A device for the advancement of bars in automatic loaders associated with a bar loading system, the advancement device having a mechanism for the individual release of the bars and a bar pusher for pushing a bar into a spindle of an automatic lathe, the bar pusher being adapted to connect with a collet which is adapted to receive the rear end of a released bar, the device further comprising:

a first guide;

a carriage operatively associated with said guide, said carriage having grip elements for a bar to be advanced, said carriage being slidably actuated between an initial position, where said grip elements are actuated so as to grip the bar deposited on said guide and a final position, where said bar is released by said grip elements after inserting the bar in the collet and into the spindle of an automatic lathe;

said bar pusher being supported for translatable movement; and

said bar pusher being actuatable and lockable between an offset position and a position where said bar pusher is aligned with the bar deposited on said first guide when said carriage is in the final position.

CLAIM 9. The device of claim 8 wherein:

said first guide includes a plurality of supporting elements.

CLAIM 10. The device of claim 8 including:

a plate articulated on said carriage and adapted to oscillate between a position for abutment on said bar and an inactive position; and

a sensor mounted on said plate and adapted to detect the abutment of said plate against one end of said bar and to activate said grip elements to grip said bar.

CLAIM 11. The device of claim 10 wherein:

said plate is retained in said abutment position by a lever which is articulated on said carriage and is controlled by a cam, said cam being adapted to articulate said lever from a position for retaining said plate in said abutment position into a position where said plate can assume said inactive position.

CLAIM 12. The device of claim 8, wherein:

said grip elements comprise V-shaped blade elements which are actuated in mutual contrast to grip the released bar interposed therebetween them.

CLAIM 13. The device of claim 12, wherein:

said blade elements are fixed on two respective posts which are parallel and slidingly supported in said carriage and have racks which mesh with a pinion, with which a lever is radially rigidly coupled.

CLAIM 14. The device of claim 13 including:

a fluid actuated jack mounted on said carriage acting on said lever.

CLAIM 15. The device of claim 9, wherein:

said supporting elements comprise brackets having supports for said released bar, said brackets being connected by tie rods slideable therein to allow the brackets to stack up on the side towards which said carriage advances.

CLAIM 16. The device of claim 10, wherein:

said bar pusher is connected to a flexible traction element slidable in a second guide, said bar pusher being lockable and slidable from said offset position to an aligned position for pushing on said bar when said carriage is in said final position and said plate is in said inactive position.

CLAIM 17. The device of claim 16, wherein:

said second guide is rotatably supported and said bar pusher is connected to said flexible traction element using a flap which is guided through a slot of said second guide.

CLAIM 18. The device of claim 17 wherein:

said second guide is actuated by a fluid-actuated jack between said offset and aligned positions of said bar pusher with respect to said bar.

CLAIM 19. In a device for the advancement of bars in automatic loaders associated with a bar loading system, the advancement device having a mechanism for the individual release of the bars and a bar pusher for pushing a bar into a spindle of an automatic lathe, the bar pusher being adapted to connect with a collet which is adapted to receive the rear end of a released bar, the improvement comprising:

a carriage having grip elements for a bar to be advanced, said carriage being slidably actuated between an initial position, where said grip elements are actuated so as to grip the bar deposited thereon and a final position, where said bar is released by said grip elements after inserting the bar in the collet and into the spindle of an automatic lathe, said bar pusher being supported for translatable movement and said bar pusher being aligned with the deposited bar when said carriage is in the final position.

CLAIM 20. The device of claim 19 wherein:

a plate articulated on said carriage and adapted to oscillate between a position for abutment on said bar and an inactive position; and

a sensor mounted on said plate and adapted to detect the abutment of said plate against one end of said bar and to activate said grip elements to grip said bar.

CLAIM 21. The device of claim 20 wherein:

said plate is retained in said abutment position by a lever which is articulated on said carriage and is controlled by a cam, said cam being adapted to articulate said lever from a position for retaining said plate in said abutment position into a position where said plate can assume said inactive position.

CLAIM 22. The device of claim 19, wherein:

said grip elements comprise V-shaped blade elements which are actuated in mutual contrast to grip the released bar interposed therebetween them.

CLAIM 23. The device of claim 22, wherein:

said blade elements are fixed on two respective posts which are parallel and slidingly supported in said carriage and have racks which mesh with a pinion, with which a lever is radially rigidly coupled.

CLAIM 24. The device of claim 23, wherein:

a fluid actuated jack mounted on said carriage acting on said lever.

CLAIM 25. The device of claim 19 including:

a guide operatively associated with said carriage, said guide supporting a bar when such bar is advanced into a collet.

CLAIM 26. The device of claim 25 wherein:

said guide includes a plurality of supporting elements.

CLAIM 27. In a device for the advancement of bars in automatic loaders associated with a bar loading system, the advancement device having a mechanism for the individual release of the bars and a bar pusher for pushing a bar into a spindle of an automatic lathe, the bar pusher being adapted to connect with a collet which is adapted to receive the rear end of a released bar, the improvement comprising:

a carriage having grip elements for a bar to be advanced, said carriage being slidable so as to advance the bar end into a collet; and

said bar pusher being aligned with the deposited bar when said carriage is in the final position.

CLAIM 28. The device of claim 27 including:

a guide operatively associated with said carriage, said guide supporting a bar when such bar is advanced into a collet.

CLAIM 29. The device of claim 28 wherein:

said guide includes a plurality of supporting elements.

CLAIM 30. The device of claim 27 including:

a plate articulated on said carriage and adapted to oscillate between a position for abutment on said bar and an inactive position; and

a sensor mounted on said plate and adapted to detect the abutment of said plate against one end of said bar and to activate said grip elements to grip said bar.

CLAIM 31. The device of claim 30 wherein:

said plate is retained in said abutment position by a lever which is articulated on said carriage and is controlled by a cam, said cam being adapted to articulate said lever from a position for retaining said plate in said abutment position into a position where said plate can assume said inactive position.

CLAIM 32. The device of claim 27, wherein:

said grip elements comprise V-shaped blade elements which are actuated in mutual contrast to grip the released bar interposed therebetween them.

CLAIM 33. The device of claim 32, wherein:

said blade elements are fixed on two respective posts which are parallel and slidingly supported in said carriage and have racks which mesh with a pinion, with which a lever is radially rigidly coupled.

CLAIM 34. The device of claim 33 including:

a fluid actuated jack mounted on said carriage acting on said lever.

A device for the advancement of bars, particularly narrow bars, in automatic loaders provided with a inclined supporting plane or with another loading system for a plurality of bars and with a mechanism for the individual release of the bars, comprising: guides, whereon supporting elements for a bar released from the plane and a carriage provided with grip elements for a bar can slide, the carriage being actuated between an initial position, where the grip elements are actuated so as to grip a bar deposited on the supporting elements, and a final position, where the bar is released by the grip elements and is secured in the spindle of an automatic lathe: a pusher which is supported so as to move parallel to itself: and actuators for actuating the pusher after the carriage between an offset position and a position wherein it is aligned with the bar deposited on the supporting elements when the carriage is in the final position.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE REISSUE APPLICATION OF:

PATENTEE: ANDREA DREI

TITLE: DEVICE FOR THE ADVANCEMENT OF BARS, PARTICULARLY  
NARROW BARS, IN AUTOMATIC LOADERS

PATENT NO.: 5,890,407

ISSUE DATE: APRIL 6, 1999

REISSUE DECLARATION

Box REISSUE  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Andrea Drei hereby declares and says that:

1. My residence, post office address and citizenship are as follows:

**Andrea Drei**

Residence: Faenza (Province of Ravenna), Italy

Post Office Address: Faenza (Province of Ravenna), Italy

Citizenship: Italy

2. I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a reissue patent is sought on the invention entitled: DEVICE FOR THE ADVANCEMENT OF BARS, PARTICULARLY NARROW BARS, IN AUTOMATIC LOADERS, the specification of which is attached hereto.

3. I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

4. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, 1.56(a).

5. I believe that my U.S. Patent No. 5,890,407 ('407) is wholly or partly inoperative or invalid by reason of my claiming less than I had a right to claim in the patent. The following is a discussion of at least one error being relied upon as the basis for the reissue:

**A. Invention Described in the '407 Patent**

The '407 patent relates to a device for the advancement of bars in automatic loaders associated with a loading system for a plurality of bars, the advancement device having a mechanism for the individual release of the bars and a bar pusher for pushing the bar into a spindle of an automatic lathe, the bar pusher being adapted to connect with a collet which is adapted to receive the rear end of a released bar. In its broadest sense and as accurately set forth by the examiner in the Notice of Allowance dated October 13, 1998, the invention disclosed in the '407 patent is composed of the combination of a bar advancement device including a carriage provided with a grip element for clamping a bar to be advanced, the carriage being slidable so as to advance the bar end into a collet and a bar pusher being aligned with the bar when the carriage is at its final position so as to secure the bar in the collet. This combination of elements has the advantage of advancing relatively thin bars into a collet with minimal damage to the bar.

**B. Claim 1 of the '407 Patent**

As is clear from the foregoing description in Paragraph 5(A), an important feature of the invention described in the '407 patent is the combination of a carriage provided with a



grip element for clamping a bar to be advanced, the carriage being slidable so as to advance the bar end into a collet and a bar pusher being aligned with the bar when the carriage is in its final position so as to secure the bar to the collet. However, claim 1, (the only independent claim in the '407) recites many other elements in addition to the foregoing which are not required or necessary for the functioning of the invention nor for distinguishing the invention of the '407 patent over the prior art. For example, claim 1 recites the following unnecessary limitations:

- (a) a guiding means
- (b) means for locking and actuating
- (c) supporting elements.

I believe that the above-elements (a), (b) and (c) (as well as the use of the means plus function language) are unnecessary limitations on my invention as disclosed in the '407 patent which unnecessarily limit the scope of the claims such that I claimed less than I had a right to claim. While elements (a), (b) and (c) certainly describe preferred structural embodiments of my invention, the fact of the matter is that the invention can take many other structural forms which, nevertheless, provide a device which performs its intended function. Consequently, the inclusion of elements (a), (b) and/or (c) in claim 1 (as well as claims 2-7), and the use of means plus function language constitute an error or insufficiency in the claims which render the claims wholly or partly inoperative or invalid by reason of my claiming less than I had a right to claim.

#### **C. New Claims 8-34**

New independent claim 8 is similar to original claim 1 with the difference being that the means plus function language has been removed. The elements recited in claim 8 find support in the figures, as well as the text at column 1, line 63 through column 4, line 44.

Claims 9-18 all depend from claim 8 and find basis in the original '407 patent. The following table references the dependent claims 9-18 as corresponding to a dependent claim in the '407 patent or as reciting a limitation found in claim 1 of the '407 patent.

Claim	Corresponds Substantially to Original Claims	Limitation Present in Original Claim1
9		"supporting elements"
10	See original claim 2	
11	See original claim 2	
12	See original claim 3	
13	See original claim 4	
14	See original claim 4	
15	See original claim 5	
16	See original claim 6	
17	See original claim 7	
18	See original claim 7	

Independent claim 19 is similar to original claim 1 with the differences being that items (a), (b), and (c) discussed above in Paragraph 5(B) are not present nor is there any use of means plus function language. Dependent claims 20-26 all depend from claim 19 and find basis in the original '407 patent as shown in the following table.

Claim	Corresponds Substantially to Original Claims	Limitation Present in Original Claim1
20	See original claim 2	
21	See original claim 2	
22	See original claim 3	
23	See original claim 4	
24	See original claim 4	
25		"guide"
26		"supporting elements"

Independent claim 27 is also similar to original claim 1 with the differences being that items (a), (b), and (c) are removed and that the subject matter specifically identified by the examiner in the Notice of Allowance dated October 13, 1998 is recited in the claim.

Dependent claims 28-34 all depend from claim 27 and find basis in the original '407 patent as set forth in the following table.

Claim	Corresponds Substantially to Original Claims	Limitation Present in Original Claim1
28		"guide"
29		"supporting elements"
30	See original claim 2	
31	See original claim 2	
32	See original claim 3	
33	See original claim 4	
34	See original claim 4	

6. The error in claiming less than I had a right to claim (described and specified in Paragraph 5) arose without any deceptive intent on my part with such error becoming known as a result of a recent analysis and review of a product known as the LNS HYDROBAR EXPRESS 226. This LNS product is substantially similar to the bar pusher device shown in the '407 patent. However, in reviewing claim 1 of the '407 patent, I noted the inclusion of claim limitations specifically directed to the preferred structural features of the bar advancement device as discussed above in Paragraph 5(B). It then became apparent that the true scope of my invention as now set forth in new claims 8, 19 and 27 (and as originally disclosed in the '407 patent) was not fully appreciated by me or by my attorney until our review of the LNS product. While I am not certain, I believe that my attorney and I failed to appreciate the full scope of my invention because of my misplaced emphasis on the details of the preferred structure of my bar pusher device which thereby prevented us from

fully appreciating the scope of the invention in terms of its broader elements as now recited in new independent claims 8, 19 and 27.

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

Date: 06-30-2000

Andrea Drei L.S.  
Andrea Drei

FIG. 1

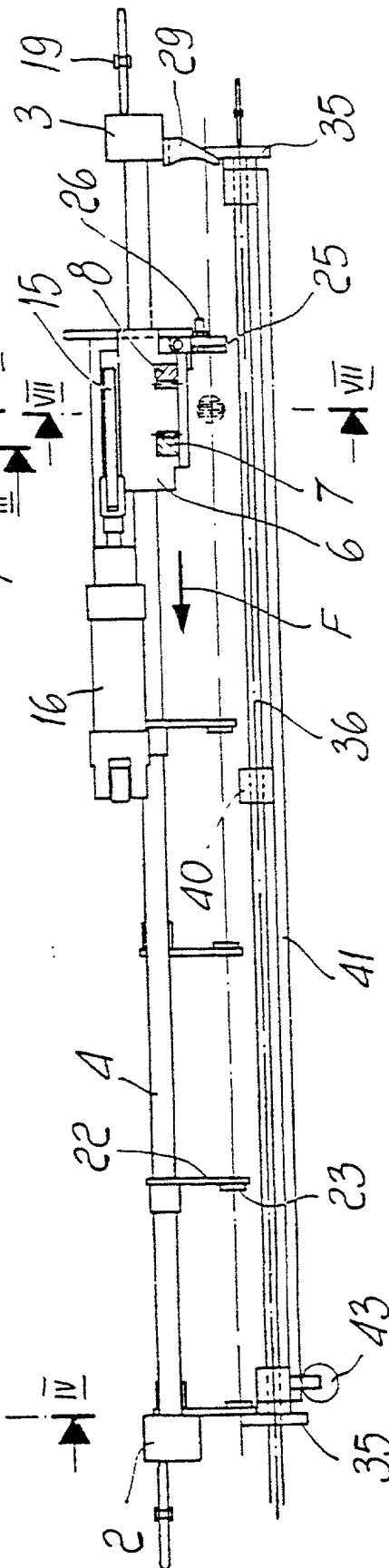
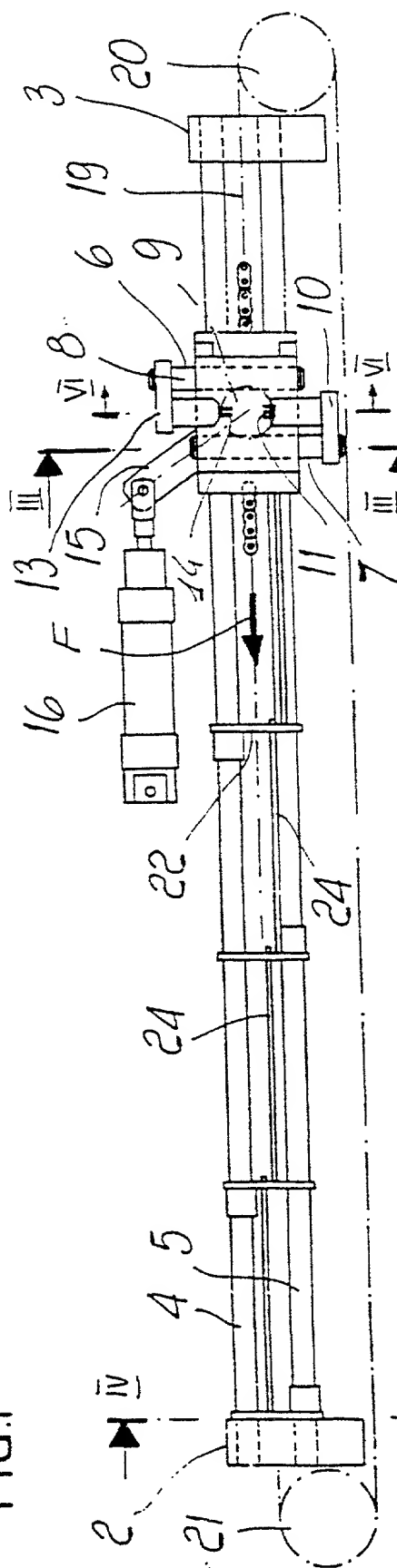


FIG. 2

FIG. 7

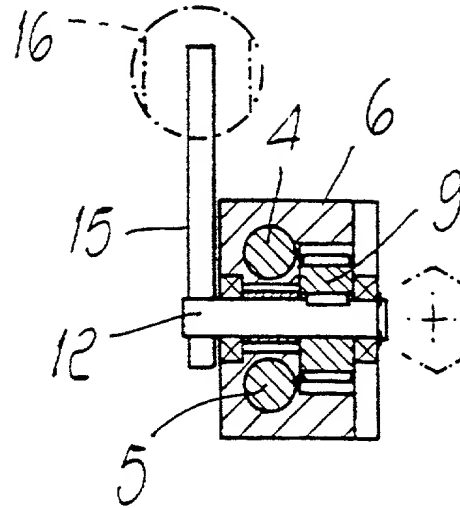
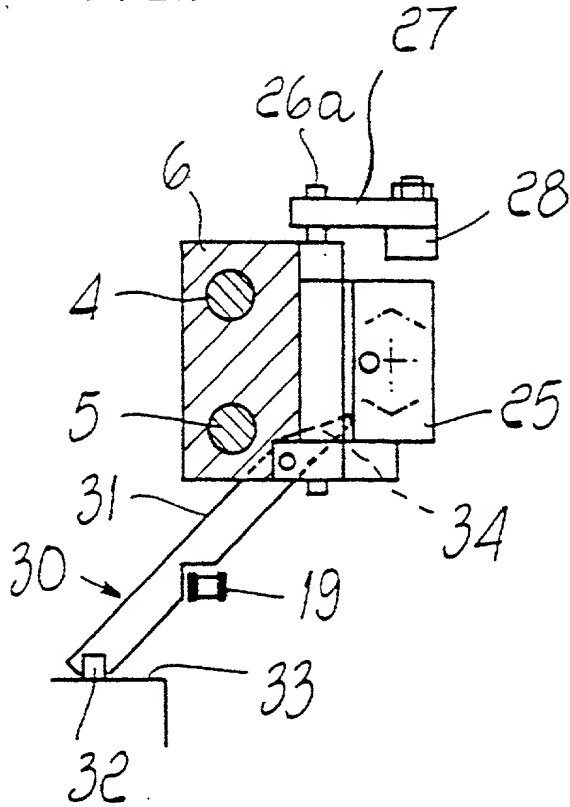
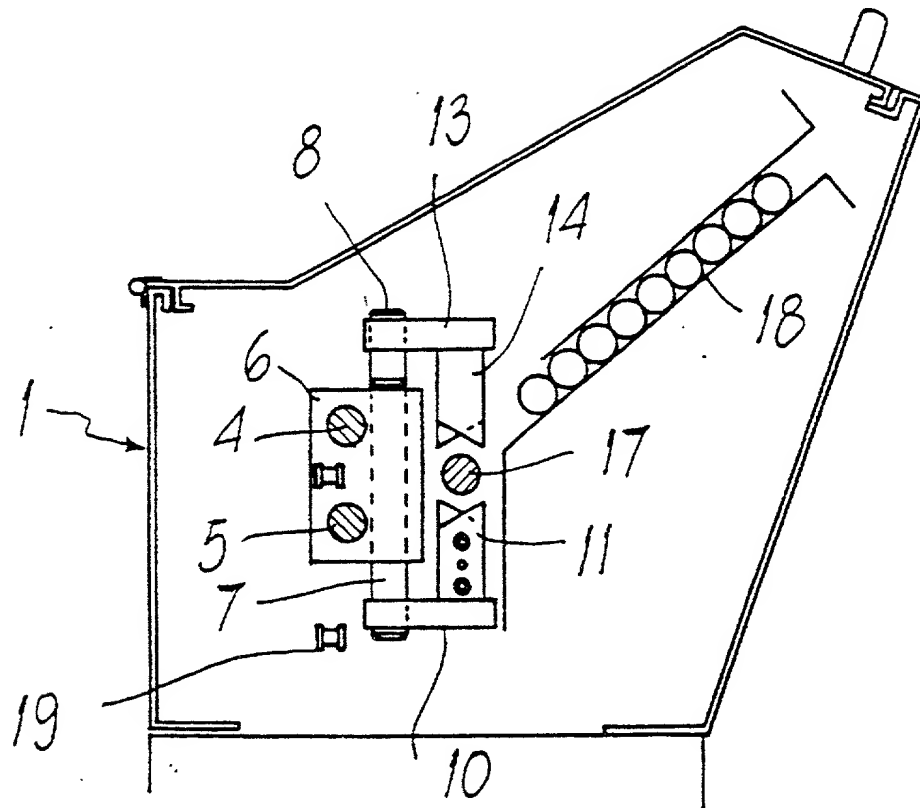


FIG. 6

FIG. 3



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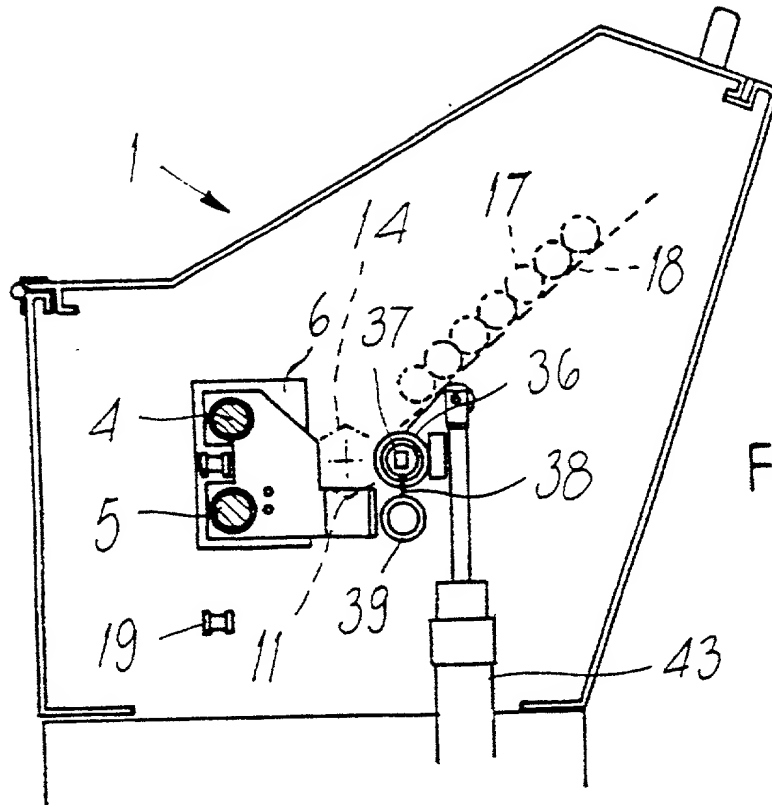


FIG. 4

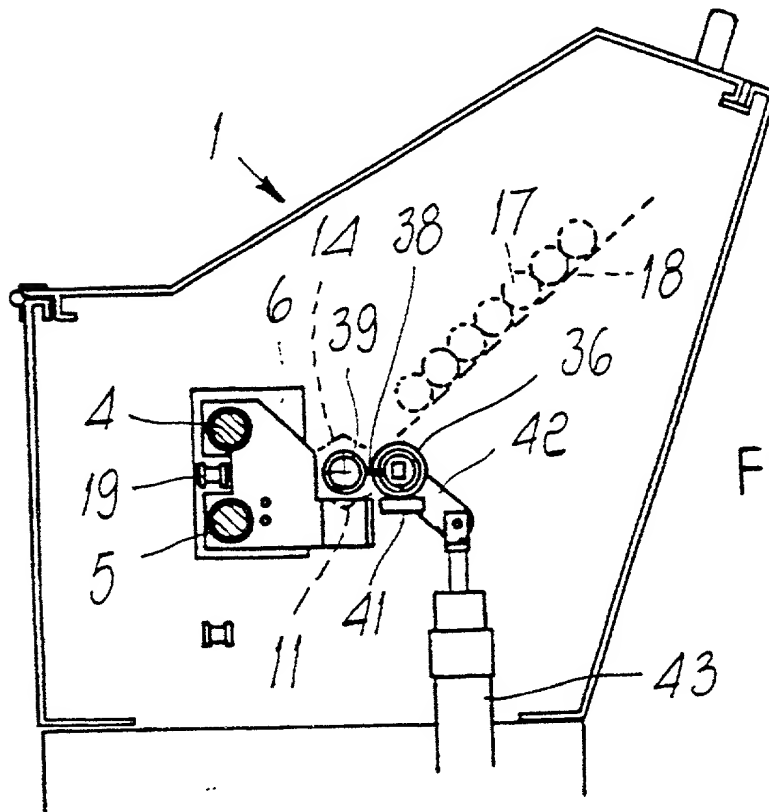


FIG. 5

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